Legs blackish green, knees and bases of tibiae reddish yellow. Basal joints of middle tarsi with some reddish color. Hind femora much thickened and with two rows of short spines below near the apex; the hind tibiae and metatarsi noticeably thickened. Legs with fine pale hairs, longer on the upper and lower surfaces of the femora. Inner side of apex of hind tibiae with longer yellow bristly hairs. Wings grayish hyaline. Anterior cross-vein oblique and placed beyond the middle of the discal cell. Stigma pale brown. Halteres yellow.

♀.—Very similar to male (see figure). Vertex and frons broad, widening a little below. Frons gray pruinose along the eye margins; hairs black across the ocelli and at base of antennae, but pale elsewhere. Third antennal joint much broader than in the male (see figures) and darker in color.

Length 5.5 to 7.5 mm.

Habitat. This species is distributed through Europe down into Spain and Italy and goes north to middle Sweden and Finland. It is reported from northern Africa and Syria. In North America there are records from Maine, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ottawa and Quebec, Canada in the east; further west it is reported from Ohio and Colorado and is now known to occur all along the Pacific Coast from California to British Columbia.

Notes on Species of Halictus Visiting Evening Flowers (Hym).

By O. A. Stevens, Agricultural College, North Dakota.

Halictus (Megalopta?) texanus (Cresson).

1872. *Sphecodes texana* Cresson, Trans. Am. Ent. Soc., v. 4, p. 249.

1887. *Parasphecodes texanus* Cresson, ibid., Supp. vol., p. 292.

1898. *Halictus texanus* Cockerell, ibid., v. 25, p. 185.

1899. *Sphecodogastra texana* Ashmead, ibid., v. 26, p. 92.

1913. *Megalopta* ——— Ducke, Zool. Jahr., v. 34, p. 85.

♀.—Mesonotum rather shining, punctures of moderate size (about 20 microns), separated by scarcely a puncture width laterally and from one and one-half to two times their width medially; basal area of propodeum with about 20 fine, irregular ridges, the angle and truncation smooth; inner spurs of hind tibiae with two to five (usually three, the upper at about the middle of the spur) slender teeth; scopa sparse, inner side of tibiae with rather sparse, long, nearly simple hairs, trochanter and lower edge of femur with only a row of simple bristles, the upper with rather shorter ones.

Blue Rapids, Kansas, June 19, 1919; many females sucking nectar at flowers of *Allionia nyctaginea* and collecting pollen of *Megapterium missouriense*; one female collecting pollen of *Hartmannia speciosa*. Oakes and LaMoure, North Dakota, July 17 to 26, 1919; occasional females sucking at *Allionia hirsuta*, collecting at *Anogra pallida* and *Onagra strigosa*. Sheldon, North Dakota, Aug. 10, 1919; one female at *Allionia hirsuta*. One male at *Helianthus petiolaris* (Sheldon) and one at *Onagra strigosa* (Oakes).

Halictus (Evylaeus) aberrans Crawford.

1901. *Halictus amicus*, var. α Cockerell, Ann. & Mag. Nat. Hist., ser. 7, v. 2. p. 126.

1903. *Halictus aberrans* Crawford, Can. Ent., v. 35, p. 336.

1903. *Halictus galpinsiae* Cockerell, ibid., p. 342.

♀.—Thorax with sparse pubescence which is griseous or somewhat ochraceous; sculptured as in *H. texanus*, the propodeum more finely wrinkled; mesonotum shining, the punctures of variable size (about 15 to 25 microns); pubescence of the abdomen of both appressed and erect hairs in variable amounts; segments 2 to 4 usually with both basal and apical bands, the basal of appressed hairs, the apical of both appressed and upright; second segment with basal patches at the sides; sides of tne first and more or less all of the other with scattered upright hairs; first segment smooth and shining, appearing impunctate in some lights and very minutely punctate in others; posterior legs as in *texanus*, inner spurs of tibiae with about five teeth.

♂.—Puncturation similar to that of female, pubescence more sparse especially on the abdomen which is scarcely at all banded; face sometimes with appressed hairs and sometimes with erect hairs predominating; seventh segment of abdomen slightly indented at apex; tibiae and tarsi yellow, the median half of middle and posterior tibiae brownish black, the anterior more reddish brown.

North Dakota, 28 females, 48 males at various places from Valley City westward to Williston and Marmarth, June 16 to Sept. 20 (mostly in June and July); females collecting pollen from flowers of *Gaura coccinea*, occasionally from *Onagra strigosa*, and sucking nectar at flowers of *Gaura coccinea*, *Lactuca pulchella*, *Helianthus petiolaris*, *Grindelia squarrosa*, *Sideranthus spinulosa*, *Solidago mollis* and *Symphoricarpos occidentalis;* males at flowers of *Allionia hirsuta*, *Allionia lanceolata*, *Gaura coccinea*, *Brassica juncea*, *Symphoricarpos occidentalis*, *Chrysopsis villosa*, *Grindelia squarrosa*, *Helianthus petiolaris* and *Lactuca pulchella*.

My first specimens of this species were 2 females and 9 males taken at Dickinson, by Mr. C. H. Waldron, at flowers of *Helianthus petiolaris* on Aug. 13, 1912. These, together with a female from Valley City, Aug. 13, 1912, at *Sideranthus spinulosus* were determined by Mr. Crawford as *H. aberrans*. Later when females were found collecting pollen at *Gaura* in the evening, I suspected the identity of *aberrans* and *galpinsiae*. Cockerell has stated (Proc. Ent. Soc. Wash., v. 9, p. 119) that "the stigma (of *galpinsiae*) is a lighter, brighter orange than in *aberrans*." Crawford in his table of species of *Halictus* (Journ. N. Y. Ent. Soc., v. 15, pp. 183–189), has separated the females on slight difference in puncturation of mesonotum and first segment of the abdomen, the males upon the nature of the hairs of the face ("appressed scale-like" in *galpinsiae*).

The North Dakota specimens agree well with Cockerell's description of *galpinsiae* and I cannot separate the ones taken at other flowers in the daytime from those taken at *Gaura* in the evening. A paratype female of *galpinsiae* sent by Prof. Cockerell agrees with the North Dakota specimens. The Dickinson specimens are in rather poor condition, the hairs being more or less matted by moisture. A female taken at Sentinel Butte on *Grindelia* in mid-afternoon is indistinguishable from the *Gaura* specimens. Mr. H. L. Viereck has kindly examined a cotype of *aberrans* in the U. S. National Museum and finds the scopa as here described.

Halictus (Evylaeus) oenotherae new species.

♀.—Length 9 to 10 mm., black with sparse, short, pale pubescence, which inclines to yellowish, especially on the legs. Face subquadrate, the front closely and finely punctured, clypeus smooth and shining with sparse shallow punctures; antennae reddish beneath. Mesonotum rather dull, the punctures of moderate size, separated by less than a puncture width laterally and scarcely more than that medially; propodeum shining, with prominent, somewhat irregular, sharp ridges; laterally these continue over the rounded edge while medially they are interrupted by a ridge; the truncation rugulose and surrounded by a ridge. Posterior legs as in *texanus*, the hairs of the tibiae somewhat more numerous and a few longer ones on the femur; inner spur of tibiae with four slender teeth; wing nervures light brown, the stigma, subcosta and median dark; first recurrent received one-fifth basad of second cubital; second submarginal narrowed only slightly above. Abdomen smooth and shining the first segment very

minutely punctured; the sides of first and second, apex of second and all of the following with thin pubescence which forms faint apical bands.

Blue Rapids, Kansas, June 20, 1919; 5 females at flowers of *Megapterium missouriense*, nearly an hour after sunset.

Type No. 12033, will be placed in the U. S. National Museum. Paratypes in collections of Prof. T. D. A. Cockerell, Prof. M. H. Swenk, and the writer.

A species similar in appearance to *H. aberrans* Cwfd.; slightly larger, mesonotum a little more closely punctured, pubescence of abdomen more scanty, the appressed type nearly absent. Differing very much in the sculpture of the propodeum which is similar to that of *H. pectoralis* Smith, to which it would run in Crawford's table (Journ. N. Y. Ent. Soc. 1907). It is quite different from *pectoralis* in its larger size and characteristic scopa.

The sparseness of the scopa, especially that of the femur, which is characteristic of these three species is evidently an adaptation to the collecting of onagraceous pollen.

Halictus (Evylaeus) swenki Crawford.

1906. *Halictus swenki* Crawford. Ent. News. v. 17, p. 275. ♀

Truncation of propodeum with rounded angles, basal area medially with a few irregular ridges which reach about half way to the angle, laterally with faint striae which reach the angle. Second submarginal cell narrowed fully one-half above, first recurrent nervure interstitial, or very nearly, with second cubital.

♂.—Length about 7 mm. Similar to the female, thorax more smooth and shining. Face subquadrate, little narrowed below; clypeus not produced, only gently rounded; mandibles slender, their tips reaching nearly to the bases of the opposite ones; apical half of clypeus and basal middle, labrum and basal two-thirds of mandibles, pale yellow; antennae reddish yellow beneath for entire length, joint 4 as long as 2+3, the latter about equal. Legs reddish yellow, anterior and middle femora at base, most of posterior femora and tibiae, dark brown on outer side; tarsi pale.

In the sand hills near Sheldon, North Dakota, Aug, 6 to 21, 1916–19. Allotype No. 12317. About a dozen females and twenty males, chiefly at flowers of *Allionia hirsuta* and *Petalostemon villosum*, also at *Linum rigidum* and *Hieracium scabriusculum*.

The male is noteworthy for the low, broad clypeus. Of the species which I have, only *H. forbesi* Rob. is similar in this respect.

Generic Position of Halictus texanus

As shown by the synonymy, this bee has been referred to various genera by different writers. The manner of pollen collecting permits a reduction of scopa which may account for its being originally placed in *Sphecodes*. Ashmead created the new genus, *Sphecodogastra*, for it on account of the enlarged ocelli. Ducke has referred it to *Megalopta* Smith, together with about a dozen little known South American species.

If we reduce *Evylaeus*, *Chloralictus*, etc., to subgenera I think *Sphecodogastra* also should be reduced. Except for the large ocelli it would not be separated from *Evylaeus*. This character has been associated with its crepuscular habits and similar examples in other genera cited. The other species here discussed, however, do not show such a character altho they have similar habits; it may be noted also that the bumblebees of the subgenus *Bombias* have larger ocelli than those of the subgenus *Bombus*. Ducke separated *Megalopta* from *Halictus* on the characters of enlarged ocelli and night flying habit, altho he does not separate *Agapostemon*, *Augochlora* and other groups. Such disposition seems scarcely tenable.

The ocelli of *texanus* are about twice the diameter of those of other *Halicti* of similar size. Those of *aberrans*, *oenotherae* and *swenki* seem a trifle larger but not appreciably so. I have examined several species (females) with the following results.

Approximate lateral diameter of anterior ocellus:

H. texanus (Cress.)	400 microns	*H. forbesi* Rob.	200 microns
H. aberrans Cwfd.	200–220 microns	*H. swenki* Cwfd.	180 microns
H. oenotherae Stevens	200 microns	*H. ligatus* Say.	150–200 microns
H. lerouxii Lep.	180–200 microns	*H. provancheri* DT.	150 microns

Visits of Halictus texanus to Flowers.

I had been very much interested in Graenicher's account (Bul. Pub. Mus. of Milwaukee, v. 1, pp. 222–225, 1911) of the unusual habits of *Sphecodogastra*, and an opportunity to verify them came on June 20, 1919, at Blue Rapids, Kansas. I found many females sucking nectar at flowers of *Allionia nyctaginea*. The time was not noted but must have been about an hour before sunset. The principal evening prim-

rose flowering there at that time was *Megapterium missouriense*. The flowers of this are yellow, 10–15 cm. wide; anthers about 1.5 cm. long, the pollen grains large and so well joined by cobwebby threads that they may be brushed off easily in one mass.

No exact time was obtained for either the first or last opening of the flowers or visits of the bees, but the flowers seemed to begin opening a little after sunset and many times bees were seen flying about the flowers not yet opened. Most of the flowers observed, opened in the earlier part of the evening. The stigma is exserted some minutes before the flower opens and the bees crawl about it searching for an opening in the bud, so that ample opportunity for cross pollination is provided. In case of one flower, at least ten or twelve visits were made before the flower opened; at one time three females were on the bud, one attacking and driving away another. They attempted to force their way into the apex and sides of the bud, flying away after some seconds. In no case was there any evidence of biting into the flower.

As soon as a small opening appeared at the tip of the flower, a bee would force her way in and begin collecting. Often they forced only a partial entrance and then withdrew. The flowers were quickly stripped of pollen so that after one or two bees had collected at a flower, later visitors flew away after a brief inspection. The pollen was gathered into a large mass which seemed to be carried chiefly between the posterior legs. On account of the darkness it was impossible to follow the flight of the bees. The last visits were about an hour after sunset (8:40 P. M. standard central time).

The principal other evening primrose flowering at that time in that locality was *Hartmannia speciosa*. The flowers of this species are white, 5–10 cm. wide, otherwise similar to those just described. They are not so strictly evening flowering as they open earlier and remain open longer in the forenoon. One trip was made to a place where these grew half a mile from where the other notes were taken. At sundown many of the flowers were open and their pollen undisturbed. During 15 or 20 minutes stay a single female was taken at the flowers collecting pollen.

At Oakes and LaMoure, North Dakota, July 17–26, 1919, several females were sucking nectar at flowers of *Allionia hirsuta*, about an hour after sunset. Searching the evening primroses for them I found females collecting pollen at *Anogra pallida*. Careful watching of a single large plant each of *Anogra pallida* and *Onagra strigosa* showed the flowers of the former beginning to open about 8:40 P. M. (sunset at 8:00), those of the latter about 9:00 P. M. A female flew about both plants 20 minutes before the flowers began to open. As soon as those of *Anogra* began to open the bees were at work quite as described at *Megapterium*. One female was taken collecting at *Onagra*, but this did not seem to be visited as much as *Anogra*. A brief visit at 9:30 showed no bees and the next morning I found that no flowers of *Anogra* had opened after that hour altho rather more of the *Onagra* flowers had opened later than before that hour. A male was found in an *Onagra* flower at sunrise on July 26th. Another had been taken in the early forenoon at Sheldon, N. D., Aug. 21, 1918, at *Helianthus petiolaris*.

Cockerell (Trans. Am. Ent. Soc. v. 25, p. 185, 1898) has recorded this bee at flowers of *Senecio douglassii* and *Pyrus communis* in New Mexico, and Crawford (Can. Ent., v. 35, p. 336, 1903) at *Grindelia*, but the time of day is not stated. At Manhattan, Kansas, Aug. 28, 1907, I took two females at flowers of *Mentzelia decapetala* (an evening flowering plant) at 7:30 P. M. This plant is not native there. At Williston, North Dakota, on Aug. 15, 1915, I visited this plant in the early evening but found none of these bees and scarcely any of other species.

Visits of Halictus aberrans to Flowers

In North Dakota this bee is a regular visitor of *Gaura coccinea* from an hour or more before sundown until dark. Both sexes visit it for nectar altho the males visit chiefly the flowers of *Allionia*. A few females have been taken collecting pollen of *Onagra strigosa* in the forenoon and visiting several other flowers for nectar both evening and morning or even well toward mid-day. At Oakes on July 18, 2 females and 9 males

were taken at *Symphoricarpos* an hour after sunrise; at the same place on July 24 one of each sex at the same flowers about half an hour before sunset. No females, however, were found at *Allionia* where most of the males were taken.

The flowers of *Allionia hirsuta* seemed to open about an hour before sunset and were withered by sunrise next morning. Those of *Gaura coccinea* open some time before sunset. They are white, about 6–8 mm. wide, petals narrow, anthers only about 2 mm. long, the pollen scanty and not so well cohering as in the species previously described. *Meriolix serrulata*, a day-flowering species, has yellow flowers, the pollen scarcely at all cohering. A number of plants of it stood with open flowers and undisturbed pollen near the place where the bees were found at *Symphoricarpos* in the morning. In the case of *aberrans* the pollen is carried between the inner sides of the posterior tibiae and femora.

No observations were made upon *H. oenotherae* farther than that the females were visiting *Megapterium* in the late evening with *H. texanus*. Two specimens have some pollen on their legs.

Visits of H. swenki to Flowers

This species has been included chiefly because many of both sexes were found at *Allionia hirsuta* at Sheldon on Aug. 10, 1919. This was during the hour before sunset. Shortly after sunset a number of plants were examined and only a single female found. The first specimens taken were several males at the same place, Aug. 13, 1916, on *Petalostemon villosum:* I had collected nearly all day at these and other plants, but took none of *H. swenki* until these in the late afternoon. At the same place, Aug. 21, 1918, two or three of each sex were taken in the early forenoon at *Linum rigidum*.

Hours of Flight of the Species mentioned.

Further data are needed to show to just what extent these bees are "night flying." Those so far available tend to show that *texanus* extends its work farthest into the night, at least until quite dark. This, according to my observations, was necessitated by the time of opening of the flowers visited for

pollen. The bees were flying as much as an hour before sunset, and quite likely may be found occasionally still earlier. For *oenotherae* only the one record is available, two of the specimens having been taken as late as any of *texanus*.

The flowers of *Gaura* visited by *aberrans* open earlier, and the bees are able to complete their work earlier, their time of greatest activity seeming to be at about sunset. This species is found quite frequently at other times of day. For *swenki*, the hour preceding sunset appears to be the time of greatest activity, altho it may also be found at other times of day. I do not know where the females collect pollen, but do not believe it is from the *Onagraceae*, as their scopa is of the ordinary type, the femora having long hairs with slender branches, arising from the two edges and meeting over the posterior surface.

Other Visitors and Notes on the Flowers.

At Blue Rapids, I took also at *Allionia nyctaginea*, females of *Halictus forbesi* and both sexes of a *Chloralictus*. At Sheldon at *A. hirsuta*, *H. forbesi* and male of *Agapostemon texanus*. At Lisbon, North Dakota, Aug. 8, 1919, a worker of *Bombus separatus* Rob. collecting pollen of *Gaura coccinea* just at sunset; at Fargo, N. D., workers of *B. ternarius* Say. and *B. fervidus* Fab. sucking nectar at *Onagra strigosa*. *Gaura coccinea* is regularly visited at dusk by brown moths of medium size (*Noctuidae?*) and I have seen the ruby-throated humming bird at both *Onagra strigosa* and *Anogra pallida* in North Dakota.

An interesting point bearing upon the controversy of attraction by color or smell is brought to notice. The bees (*H. texanus*) were observed flying about the flower buds before any sign of opening was visible. It scarcely seems possible that they could then be attracted by either color or odor. The odor of the freshly opened flowers of *Anogra* is strong and heavy, quite noticeable at a distance of a meter. The opening of the flower was sudden, a small cleft appearing at the apex, increasing to 6 or 8 mm. in a few minutes, then suddenly opening wide (in perhaps 15 or 20 seconds).

A group of *Onagra* plants were examined at intervals at Fargo, North Dakota, on Aug. 1, 1919, the number of open flowers removed each time were:

8:30 P. M.—6	11:00 P. M.—0 (3 nearly open)
9:00 P. M.—48	Aug. 2.
9:30 P. M.—29	6:00 A. M.—28
10:00 P. M.—16	9:00 A. M.— 0
10:30 P. M.—12	12:00 M.— 0

No bees were seen and none of the species described are known to occur in that locality.

Some Notes on the Occurrence of Delphacinae (Hemip. Homop.)

By C. S. Spooner, Urbana, Illinois.*

During several years the writer has spent considerable time collecting Hemiptera, making a special effort to obtain specimens of Delphacinae. In the course of this collecting he has been impressed with the fact that the species of this sub-family usually occur in what might be termed "pockets"; small areas, differing but slightly from the surrounding environment, very rich in genera and species.

The following notes will serve to substantiate this: While collecting at Middletown, New York, in July, 1910, the writer took a number of species in a pasture east of the city. The pasture was bordered on the east and for a few yards on the south by woodland. In the southeast corner of the pasture the following species were taken: *Liburnia campestris* VanD., *L. lutulenta* VanD., *L. osborni* VanD., *Pissonotus brunneus* VanD., *P. marginatus* VanD., and *P. divaricatus* Spooner.

The species of *Liburnia* were found in fewer numbers over the rest of the pasture but the others were found nowhere else. Perhaps in this case, the increased shade afforded by the trees was responsible for the localized occurrence.

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*Contributions from the Entomological Laboratories of the University of Illinois, No. 60.